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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,651	05/11/2001	Ludovic Fleury	Q64436	5236

7590

04/22/2004

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EXAMINER

HUG, ERIC J

ART UNIT

PAPER NUMBER

1731

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/852,651	<b>Applicant(s)</b> FLEURY ET AL.	
	<b>Examiner</b> Eric Hug	<b>Art Unit</b> 1731	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

The following is in response to the amendment filed on January 26, 2004.

### ***Claim Rejections - 35 USC § 102***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Presby (US 4,362,943). Presby discloses a method of measuring the refractive index profile and core diameters of optical fiber preforms and optical fibers. Measurements of the index profile are used control the rate at which a fiber is drawn and to assess the fiber's transmission properties. See particularly column 3, line 64 to column 4 line 36. To insure single-mode propagation in the optical fiber, a relationship between the relative index difference  $\Delta$  (between core index and cladding index) and the core diameter  $2a$  must be satisfied according to equation (1) in column 4. The relative index difference is fixed during preform fabrication. The diameter of the core is adjusted while drawing the fiber to satisfy equation (1). Variations in the relative index difference or in the core diameter can be compensated for in this manner. Therefore, with respect to claims 1 and 2, Presby teaches determining variations in the characteristics of the preform (core diameter, index profile) prior to heating the preform, whereby such determination shows how closely the measured profile approaches an optimum distribution. Presby then modifies the core diameter of the optical fiber during drawing based on the index profile

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determinations, such modification insures single-mode propagation, thus compensating for any effects that the variations have on the propagation. With respect to the other claims:

Claim 3: Equation (1) shows that one must decrease the core diameter of the fiber  $2a$  when the variation  $\Delta$  increases in order to satisfy the relationship.

Claim 4: Diameters/radii of the preform core and cladding are taken into account.

Claim 5: Index profiles are taken into account.

Claim 6: A predetermined limit is set by equation (1).

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Presby (US 4,362,943) in view of Dudderar et al (US 4,102,661). As described above, Presby discloses a method of measuring the refractive index profile and core diameters of optical fiber preforms and optical fibers. Measurements of the index profile are used control the rate at which a fiber is drawn and to assess the fiber's transmission properties. Presby does not expressly disclose the amount of modification to the diameter of the optical fiber during drawing. Presby does disclose that the typical single-mode fiber will have a core diameter of 5 to 10 microns (column 3, lines 62-63). It would be gleaned from such a small diameter that a change in diameter much smaller than 5 to 10 microns would be necessary to maintain the desired transmission properties. Nevertheless, Dudderar teaches that optical fibers much be fabricated with close tolerances, particularly single-mode type fibers whereby the fiber diameter must be constant along the fiber

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length to within less than 1 percent. For a nominal 100 micron diameter fiber (column 4, line 24) and tolerances to less than one percent (column 1, lines 15-17, 31-34), this would result in a diameter change of less than one micron. Therefore, with respect to the claims, at the time of the invention it would have been obvious to one skilled in the art that modifications to the nominal fiber diameter in Presby must be less than 2 microns or less than 2% to maintain the desired optical transmission properties.

### ***Response to Arguments***

Applicant's arguments filed on January 26, 2004 have been fully considered and are persuasive. Upon reconsideration of the prior art of record, it is understood that none of the applied references specifically teach varying a diameter of an optical fiber during drawing based on variations of preform characteristics departing from intended design as determined prior to heating of the preform, and whereby varying the diameter of the optical fiber compensates for the effect of the preform variations on propagation characteristics. Matsumura et al (US 4,406,518) draws an optical fiber at a drawing ratio  $(d/a)^2$ , where  $d$  is the core radius of the preform and  $a$  is the core radius of the optical fiber. The fiber diameter will change as the preform diameter varies, however the change in fiber diameter is not based on deviations from preform design or propagation characteristics. Dudderar et al (US 4,102,661) is concerned with maintaining a constant fiber diameter based on measurements of the preform upon heating. Harding (US 4,793,840) is concerned with maintaining a constant fiber diameter based on continuous measurements of the fiber diameter as it is drawn from the furnace. Accordingly, the rejection of claims 1-6 and 9 under 35 U.S.C. 102(b) as being anticipated by Matsumura et al

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(US 4,406,518), the rejection of claims 1, 4, and 6-9 under 35 U.S.C. 102(b) as being anticipated by Harding (US 4,793,840), and the rejection of claims 1, 2, and 4-9 under 35 U.S.C. 102(b) as being anticipated by Dudderar et al (US 4,102,661) have all been withdrawn.

The rejection of claims 1, 2, 4-6, and 9 under 35 U.S.C. 103(a) as being unpatentable over Abe (US 6,502,429) has been overcome because a translation of the foreign priority papers has been made of record in accordance with 37 CFR 1.55. The translation was received on January 26, 2004.


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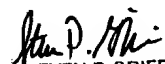
New grounds of rejection have been presented in this office action, including the rejection of claim 3 which was indicated as being allowable in the previous office action. Accordingly, this action is non-final.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Hug whose telephone number is 571 272-1192. The examiner can normally be reached on Monday through Friday, 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
jeh

  
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